Problem Set I Math 207 Pledged_____
100 points

You may use your own notes, any notes on the class conference, but you MAY NOT DISCUSS this problem set with another person. When you sign the pledge above, you are giving your word that you completed this problem set according to the rules stated above. Your signature also indicates that the work turned in for grade represents your work. No use of the internet for this problem set.

Working through a problem set is part of the learning process, where you can think about the problem and review anything that we have covered in class. Your work represents what you have learned and been able to assimilate. This problem set includes the topics from Probability and Counting. Do not wait until the night before to work these problems. Due class time on Wednesday, February 9, 2011.

Make sure that you show all work and that you put your problems in order neatly!

BONUS: Attach your work on the bonus problems: (20 points each)

(1) Socks where the number of black socks must be at least two and the probability of selecting 2 red socks is 1/2, 2/3, 3/4.

(2) An algorithm to predict the number of zeros at the end of N!

1. Given the set of numbers {1, 3, 5, 6, 8, 9} and the operation of multiplication. Respond to the following: (a) Make a sample space; (b) What is the probability that the product is odd given that there are no repeats of the numbers in the set; (c) What is the probability that the product is divisible by 3 given that there are repeats of the numbers in the set; (d) What is the probability that the product is at least 26 given that there are no repeats? (12 points)

2. You have 20 people ready to take an aerial picture with 6 people forming a center circle and 14 people encircling them. In a circle the last person will be standing next to the first person placed. (a) How many different arrangements are possible? (b) What if these people were placed in four pictures of five people each, how many different pictures are possible? (10 points)

3. You have a bag with 5 red, 6 blue, and 7 green balls. Find the following: (4 each)

(a) You pick 3 balls. What is the probability that you have one of each color?

(b) You pick 3 balls. What is the probability that all three are the same color?

Pick two balls and discard them, so you now have 16 balls in the bag. Find the following: (6 each)

(a) You pick 3 balls. What is the probability that you have one of each color?

(b) You pick 2 balls. What is the probability that both are the same color?

4. You have a fair cubical die. Roll the die 18 times. Respond to the following: (6 each)

(a) What is the probability that you roll at most three times the number 6?

(b) What is the probability that you roll at least ten even numbers?

5. You are evaluating four shippers in your area. Firm Jake provides .15 of the stock and falls behind 8% of the time. Firm Kevin provides .25 of the stock and falls behind 9% of the time. Firm Lynn provides .30 of the stock and falls behind 10% of the time. Firm Mike provides the rest of the stock and falls behind 7 % of the time. Respond to the following: (6 each)

(a) Given that a shipment comes in on time, what is the probability that is came from Firm Mike?

(b) Given that a shipment comes in late, what is the probability that it came from Firm Lynn?

6. (14 points) Alice, Cindy, and Gayle play softball. The probability that Alice will make a hit is 1/5; the probability that Cindy will make a hit is 1/4; the probability that Gayle will make a hit is 1/3. These three bat in order, Alice then Cindy and last Gayle. Each takes a single swing in practice and then rotates. This could go on indefinitely (but probably won't). (a) What is the probability that Alice will make the first hit? (b) What is the probability that Cindy will make the first hit? (c) What is the probability that Gayle will make the first hit? (When you add the answers, $a + b + c = 1$.)

7. (20 points) You have a pair of fair four-sided dice. You need to make up a game, similar to the game of craps (a way to win on the first roll, lose on the first roll, and at least three totals that become points that must be re-rolled before rolling some total). You need to make the sample space, design the rules, and show that your game gives the probability of winning to be between $.450 < P(x) < .460$. Clearly state the rules so that there is an outcome (win, lose, point) for each possible total.